

Korea: Impressive innovation capacity*

* Extract from Lopez-Claros, Augusto and Mata, Yasmina, “Policies and Institutions Underpinning Country Innovation: Results from the Innovation Capacity Index,” *The Innovation for Development Report 2010–2011*, pp. 36–38.

Korea is ranked 11 in the 2010 edition of the Innovation Capacity Index, because it does extremely well in many of the areas captured by the Index. Figure 3 shows Korea’s relative performance with respect to other high-income countries in ten of the indicators used in the estimation of the Index. Let us begin by highlighting a few facts about Korea’s innovation capacity. First, the information and communications technology industry is a powerful engine of economic growth, contributing over 40 percent to the total expansion of GDP growth in recent years. Second, expenditure on research and development in relation to GDP has risen from under 1 percent in the 1980s to close to 3.5 percent in 2009, well above the OECD average. Third, the share of R&D expenditure carried out by the private sector had risen from 29 percent in 1970 to over 70 percent by 2000. Fourth, the average number of patents granted in the United States to Korean firms rose from about 10 per year during the period 1963–1986 to an average of about 4,800 per year during the period 2002–2007, a close to 500-fold increase. Fifth, the share of ICT in total manufacturing in Korea is 20.2 percent, higher than in any other country in the OECD other than Finland, where it is slightly higher. Indeed, the share of ICT goods in total merchandise exports (close to 35 percent) is higher in Korea than in any other member of the OECD, except for Israel. Finally, Samsung, the company that perhaps best exemplifies Korea’s transformation over the past five decades from an agricultural society into a technology powerhouse now has research centers in Europe, the United States, Japan, Russia, India, and China, 27 manufacturing facilities in 12 countries, and an extensive network of sales organizations in 50 countries across the world.¹

The role of government policy

What are some of the factors that have contributed to this impressive performance, perhaps matched only by Taiwan over the same period? Without doubt, a primary engine of change has been government policy, which at various times has provided critical support to the development of the ICT sector through a variety of policy instruments and incentives. The Korean economy has opened rapidly over the past 30 years and this has facilitated technology transfer, boosted international competi-

tion in the domestic market, and allowed economies of scale. A first step was taken in 1984 when the law regulating FDI was amended to broaden the sectors into which investment was permitted, with restrictions changed from a positive to a negative list, and restrictions on majority ownership relaxed. A second wave of liberalization for FDI came ahead of OECD entry in 1996. This was boosted further after the 1997–98 financial crisis, which had the effect of persuading the Korean authorities of the clear advantages of non-debt capital inflows to finance economic development. The New Foreign Investment Promotion Act (1998) brought about several incentives to promote inward FDI, including corporate income tax concessions, exemptions from customs duties on imported capital goods and various subsidies for firms setting up in specially designated economic zones. In parallel to the creation of an increasingly friendly environment for foreign investment—and thus a strong reliance on foreign technology—the capacity of Korean firms to enter into strategic alliances with companies abroad was significantly enhanced. For instance, over the past decade or so Samsung has signed a number of partnerships: with Nokia (2007) to co-develop technology for handsets; with IBM (2006) to co-develop and market technologies for industrial printers; with Sun Microsystems (2005) to cooperate on next-generation computing systems; with Sony (2004) for collaboration on development of 7th generation LCDs; with Hewlett-Packard (2003) to share technology for ink-jet printers; and with Microsoft (2001), to co-develop digital household electronics, to name just a few.² All of these companies, and many others, have established research centers in Korea.

The virtues of an open trade regime

A second dimension of increasing openness has been a fairly ambitious program of trade liberalization. For instance, average most-favored nation (MFN) tariffs for manufactures of electrical industrial machinery were reduced from 19.6 percent in 1988 to 4.6 percent by 2006. Tariffs on manufactures of radio, television, and communications equipment were reduced from 13.1 percent in 1988 to 1.1 percent by 2006. Similar tariff reductions applied to other ICT-related products. A particularly important instrument in this regard has been the

WTO's Information Technology Agreement, a comprehensive framework that came into force in 1997, when 40 nations, including Korea, accounting for over 90 percent of world trade in ICT products, agreed to the elimination of tariffs on a range of ICT products. As a result, the growth of imports of ICT products accelerated sharply, but that of exports grew even faster. Indeed, the trade figures for ICT products are nothing short of spectacular. Imports in 1999 were US\$30.3 billion and had risen to US\$54 billion by 2005. Exports in 1999 were US\$48.5 billion and rose to US\$102.3 billion by 2005. As a result, the trade surplus on ICT products rose from US\$18.2 billion in 1999 to US\$48.4 billion in 2005. The penetration of the Chinese market was particularly swift, with Korean exports rising from US\$5.5 billion in 1999 to US\$35.6 by 2005.³ To take a specific example, total exports of mobile handsets rose from under US\$600 million in 1995 to well over US\$17 billion in 2006, a close to 30-fold increase—impressive by any standards. Indeed, as noted by Onodera and Kim (2008, p. 114), Korea's "industrialization drive has been strongly led by exports," with the export-to-GDP ratio rising from some 5 percent in 1962, to 43.6 percent by 2009, notwithstanding a vertiginous rise in GDP, among the highest in the world.

The latest technologies and human capital

Equally impressive has been the extent to which use of the latest technologies has penetrated Korea, both within the business community, government, and civil society. Broadband Internet subscribers per 100 inhabitants rose from 13 in 2000 to 32 in 2008. Internet usage per 100 inhabitants was 45 in 2000 and had risen to 77 by 2008. there were 57 mobile phone users per 100 inhabitants in 2000 and 95 by 2008. Similar increases can be noted in personal computer use, e-commerce, and Internet banking subscribership. These penetration rates often exceed those of other OECD members having much higher levels of income per capita. The UN e-Government Readiness Index ranks Korea as number 1 among 180 countries in its latest edition, reflecting the extent to which the growth of the ICT sector in Korea has affected every dimension of economic life, including the delivery of services by the government.

But, as seen in Table 9, trade and investment policies have only been one dimension of Korea's approach to the rapid development of the ICT sector and the creation of an impressive innovation capacity. The government has also been aggressive in the way it has gone about developing a modern infrastructure for higher education and training.

Korea has the highest tertiary enrolment rate in the world: 96.1 percent. The Electronics and Telecommunications Research Institute was established in 1976, part of ten government-sponsored research institutes created with a mandate to boost Korea's science and technology capabilities, develop its skilled technological manpower, and promote private sector participation in research and development. The number of fully qualified researchers engaged in R&D in Korea rose from under 6,000 in 1970, to about 224,000 in 2007, a 37-fold increase.

Korea's rise from a relatively simple agricultural society in the early 1960s to a leading industrial and technological power by the beginning of the new century is worthy of admiration, particularly when set against the background of the relatively pessimistic expectations after the Korean war; a country with such a difficult political geography and modest natural resource endowments might well have raised questions about its long-term viability. That a country could transform itself in so short a period into a high-income industrial giant with a huge footprint on the global economy highlights two important facts: a) the powerful role of sensible economic policies in enabling a country to embark on a path of self-sustaining economic growth, and b) the extent to which governments can, in fact, contribute to rising prosperity for their populations, notwithstanding the many limitations of the free market economy, so painfully evident during the latest global financial crisis.

¹ See Onodera and Hann, 2008.

² OECD, 2008, p. 147.

³ In 1999, the United States was Korea's most important trade partner. By 2005, by a significant margin, the most important markets for Korean ICT exports were China and the EU, accounting for roughly half of the total.

Figure 3. Korea: Significant indicators above income group average

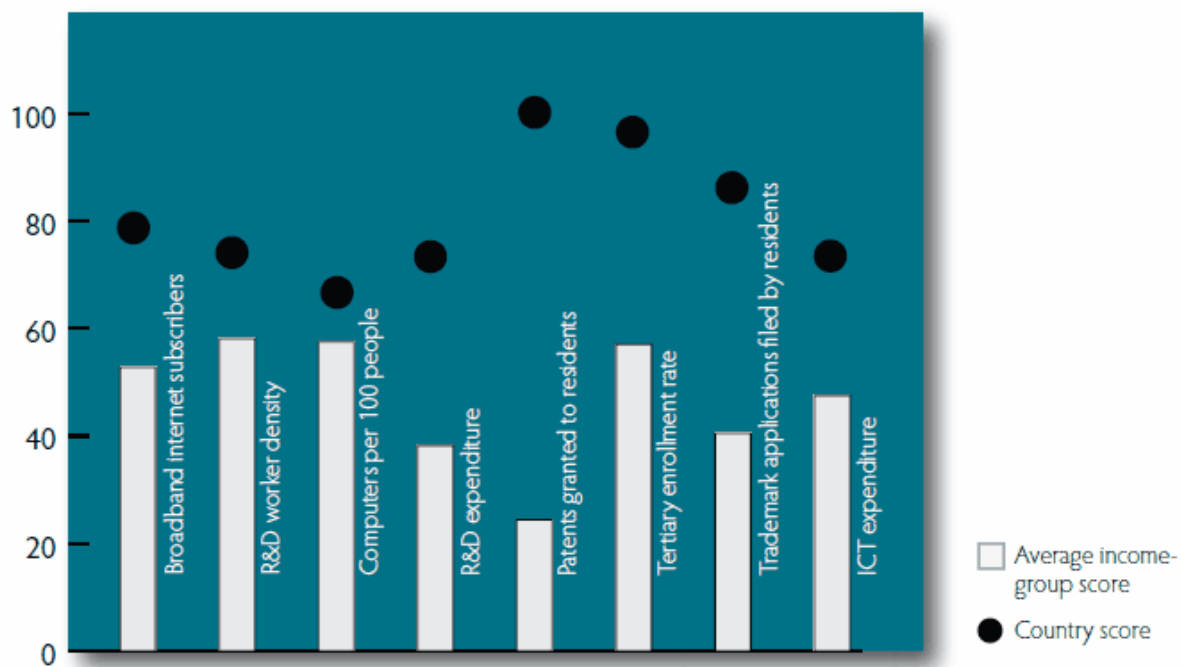


Table 9. Korea: ICI pillar rankings

	Rank	Score
Overall position	11	72.1
1. Institutional environment	34	59.1
2. Human capital, training, and social inclusion	35	67.4
3. Regulatory and legal framework	51	69.0
4. Research and development	5	67.6
5. Use of information and communication technologies	10	84.5